



Big Darby Creek, Ohio

Construction Watershed-Based General Permit OHC100001

Permitting Authority Contact:

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Pollutants of Concern in Watershed:

phosphorus, sediment, fecal coliform bacteria, dissolved oxygen, and ammonia

Pollutants Addressed in Permit:

Sediment from construction projects of one acre or larger in the Big Darby watershed

Permit Issued: September 12, 2006

Effective Date: October 27, 2006

Permit Information:

www.epa.state.oh.us/dsw/permits/DarbyStormWater_Final_GP_sep06.pdf

Overview and Highlights

The Big Darby Creek watershed is in central Ohio, draining agricultural areas and suburbs to the northwest and west of Columbus. The Big and Little Darby creeks have been designated as State and National Scenic Rivers, and the watershed is known to provide habitat for several state and federally listed endangered species.

The Ohio Environmental Protection Agency (Ohio EPA) conducted the first comprehensive survey of the Big Darby Creek watershed in 2001–2002, and the primary causes of impairment included nutrient enrichment, siltation, organic enrichment, pathogens, low dissolved oxygen, and habitat alterations. Pollution sources identified in the watershed included row crop agriculture, pastures, home sewage treatment systems, development, urban runoff, channelization, riparian removal, land application of manure, and sewage disposal. This survey served as the environmental assessment phase of a total maximum daily load (TMDL) the U.S. EPA developed and later approved on March 31, 2006. In addition, the results of the survey, in part, led to the establishment of an Environmentally Sensitive Development Area (ESDA) in a portion of the watershed and a moratorium on installing centralized waste treatment facilities until a number of conditions were met that would protect water quality. These conditions were established in the region’s waste treatment plan (i.e., the 208 Plan or Water Quality Management Plan).

Two major policy and planning documents justified the need for a construction general permit in the Big Darby watershed: the Big Darby Creek TMDL and the regional 208 Water Quality Management plan (i.e., *Central Scioto Plan Update* or CSPU). The state issued a construction general permit for the Big Darby watershed on September 12, 2006 (effective October 27, 2006).

Watershed: <i>Big Darby Creek, Ohio</i>		
Key Water Quality Concerns: <i>Nutrients, silt, total suspended solids, fecal coliform bacteria, dissolved oxygen, and ammonia</i>		
Stakeholder Involvement Techniques: <i>Public participation in process of issuing the watershed-based construction general permit</i>		
Case Study Issues of Interest		
Type of Point Sources	POTW Discharges	
	Industrial Process/Nonprocess Wastewater Discharges	
	Concentrated Animal Feeding Operations	
	Municipal Separate Storm Sewer System Discharges	
	Construction Site Stormwater Discharges	✓
	Industrial Facility Stormwater Discharges	
	Combined Sewer Overflows	
Highlighted Approach(es)	Statewide Watershed Approach	
	Implementation of Water Quality Standards	
	Implementation of Total Maximum Daily Loads or Other Watershed Pollutant Reduction Goals	✓
	Permit Coordination/Synchronization	
	Integrated Municipal Requirements	
	Point Source – Point Source Water Quality Trading	
	Point Source – Nonpoint Source Water Quality Trading	
	Discharger Association	
Coordinated Watershed Monitoring		

This case study focuses on using a watershed general permit to require control measures and best management practices for construction stormwater that address recommendations from the TMDL.

Permitting Background

The Big Darby Creek TMDL identified specific management recommendations for the Big Darby Creek watershed. Some of the recommendations included in the TMDL addressed construction-related stormwater runoff and were summarized as follows in a fact sheet (Ohio EPA 2005b):

- Ohio EPA will evaluate issuing general permits for runoff associated with construction activity that are specific to the Big Darby Creek watershed. These would most likely be developed for the Hellbranch Run watershed, the Big Darby Creek headwaters areas, and the rest of the Big Darby Creek watershed.
- Ohio EPA will evaluate each general stormwater permit to ensure pollution loading targets in the TMDL are achieved. Permits will include management practices and discharge limits designed to reduce sediment runoff and protect sensitive aquatic life uses in the watershed.
- Ohio EPA will continue to consider construction companies as co-permittees on stormwater permits. They will share responsibility with the developer for complying with permit conditions.
- Developers will be expected to evaluate their project's effect on volume of flow and provide stream buffers that reduce sediment runoff.

In addition, the 2002 update of the CSPU (section 5.02.02.03) delineated an ESDA to encompass parts of the Big Darby Creek watershed in western Franklin County. The plan stated,

Unplanned and uncontrolled growth poses a threat to the Darby Creek watershed and the unique biodiversity of its aquatic and prairie land ecosystem. It is recognized that some future development of this area will occur. While the City of Columbus will ultimately provide centralized service within a portion of it, as described in Section 5, no service whatsoever shall be provided within the ESDA until the following conditions are met for the area to be served: 1) riparian buffer restrictions are in place; 2) comprehensive stormwater management planning has occurred; 3) conservation development restrictions are in place which involve the concept of clustering development to preserve tracts of open space, including farmland; and 4) adequate public facilities, including roadways, exist or are planned to support any proposed development.

Because of this plan, Ohio EPA decreed that no sewer service would be provided in the ESDA areas until measures were in place to adequately protect water quality. As a result, local governments then passed ordinances that greatly restricted development to comply with this decree. The CSPU required that an external advisory group (EAG) be formed to make recommendations concerning water quality in the ESDA. The 2002 CSPU also charged the director of Ohio EPA with the task of determining if the EAG recommendations would be protective of water quality and updating the CSPU with a set of criteria for riparian buffers, stormwater, open-space conservation, and development. One of the measures that Ohio EPA deemed necessary to protect the ESDA was a construction general permit for activities within the Big Darby watershed.

Permit Strategy

On December 30, 2005, Ohio EPA posted on its Web site a draft of the Big Darby Construction General Permit (Big Darby CGP) for public comment and received comments on the document until March 16, 2006. The state developed and released a responsiveness summary on August 9, 2006, which detailed the comments received and Ohio EPA's response to each (www.epa.state.oh.us/dsw/permits/responsiveness_CGP_Darby_aug06.pdf).

Ohio EPA requires that all construction activities of one acre or more occurring in the Big Darby watershed be covered by this permit, unless an individual permit is required or the permitting authority requires coverage under a different general permit. The permittee may request this latter option as well to avoid coverage under the Big Darby CGP, but the permitting authority must approve this option.

The Big Darby CGP particularly addresses the need for sediment and hydrologic controls of stormwater concurrent with all phases of construction activity that are of the most concern according to the findings of the 2001–2002 survey, the TMDL, and the CSPU document. Specifically, the Big Darby CGP addresses the reduction of sediment runoff, riparian buffers, post-construction stormwater treatment, and project flows.

Permit Highlights

The Big Darby CGP does not just require developers of projects to *consider* riparian setbacks and ground water recharge, but it requires them to implement these practices and undertake mitigation measures if these requirements are not met. The permit details the specific processes for determining applicable setbacks, ground water recharge requirements, and mitigation requirements.

Permit Components

The Big Darby CGP requires that developers implement “control measures/BMPs [best management practices] for construction sites that reflect recommendations set forth in the U.S. EPA-approved Big Darby Creek TMDL.” Specifically, there are a number of conditions/requirements in the Big Darby CGP that differ from Ohio EPA’s standard construction stormwater general permit, which is otherwise applicable statewide. The following is a description of the permit conditions along with selected permit language.

Stormwater Pollution Prevention Plan Submittal and Approval

Part III.B of the permit requires submittal and approval of the Stormwater Pollution Prevention Plan (SWP3) before construction begins.

Riparian Setbacks

Part III.G.2.b of the permit requires riparian setback distances from streams as recommended within the Big Darby Creek watershed TMDL and included within the state’s 208 Plan. The permit language is as follows:

b. Riparian Setback Requirements. The [Stormwater Pollution Prevention Plan] (SWP3) shall clearly delineate the boundary of required stream setback distances. No construction activity shall occur within the delineated setback boundary except activities associated with restoration or recovery of natural floodplain and channel form characteristics as described in Attachment B and stormwater conveyances from permanent treatment practices. Such conveyances must be designed to minimize the width of disturbance. If intrusion within the delineated setback boundary is necessary to accomplish the purposes of a project then mitigation shall be required in accordance with Part III.G.2.c of this permit. Streams requiring protection under this section are defined as perennial, ephemeral or intermittent streams with a defined bed, bank or channel. Natural Resources Conservation Service (NRCS) soil survey maps should be used as one reference and the presence of a stream requiring protection should also be confirmed in the field. Any required setback distances shall be clearly displayed in the field prior to any construction related activity.

The permit requires the use of one of three different approaches to determine the necessary setback distance.

Setback Mitigation

Part III.G.2.c of the permit requires mitigation if there is intrusion within the required setback areas. Permit language is as follows:

c. Riparian Setback Mitigation. The stream setback corridor (calculated using one of the methods in Part III.G.2.b of this permit) consists of up to 3 zones. Zone 1 extends from 0 to 25 feet from the stream edge. Zone 2 extends from 25 to 100 feet from the stream edge, and Zone 3 extends from 100 feet to the outer edge of the setback corridor. Intrusion into these zones will require the following mitigation within the same Watershed Assessment Unit (14-digit HUC scale):

1. Four times the total area disturbed in the stream and within Zone 1 of the site being developed shall be mitigated within Zone 1 of the mitigation location. At least a fourth of the mitigation area shall be mitigation in the form of stream restoration in accordance with Attachment B of this permit. The remaining mitigation can be in the form of restoration or protection.
2. Three times the area disturbed within Zone 2 of the site being developed shall be mitigated within Zones 1 and/or 2 of the mitigation location.
3. Two times the area disturbed within Zone 3 of the site being developed shall be mitigated within any Zone of the mitigation location.

All mitigation shall, at a minimum include conserved or restored setback zone, and should be designed to maximize the ecological function of the mitigation. Including mitigation at the stream edge along with associated setback areas is one way to maximize ecological function. Mitigation shall be protected in perpetuity by binding conservation easements or environmental covenants.

Ground Water Recharge

Part III.G.2.d of the permit requires using structural and nonstructural BMPs to have post-construction ground water recharge rates equal to or exceeding predevelopment ground water recharge rates. Permit language is as follows:

d. Ground water Recharge Requirements. The SWP3 shall ensure that the overall site post-development ground water recharge equals or exceeds the pre-development ground water recharge. The SWP3 shall describe the conservation development strategies, BMPs and other practices deemed necessary by the permittee to maintain or improve pre-development rates of ground water recharge. Protection of open space (infiltration areas) shall be by binding conservation easements that identify a third party management agency, such as a homeowners association/condominium association, political jurisdiction or third party land trust.

The permit includes tables (Tables 1 and 2) that provide annual average expected total ground water recharge or stream baseflow recharge per land use as well as definitions of land uses. The permit then provides a specific procedure for calculating predevelopment and post-development ground water recharge.

Part III.G.2.d.iii of the permit prohibits infiltration of untreated stormwater runoff from certain activities:

iii. Any activity that is expected to produce stormwater runoff with elevated concentrations of carcinogens, hydrocarbons, metals, or toxics is prohibited from infiltrating untreated stormwater from the area affected by the activity. The ground water recharge mitigation requirement for areas affected by such activities must be met by methods which do not present a risk of ground water contamination.

The following land uses and activities are typically deemed stormwater hotspots:

- ◆ vehicle salvage yards and recycling facilities
- ◆ vehicle service and maintenance facilities (i.e. truck stops, gas stations)
- ◆ fleet storage areas (i.e. bus, truck)
- ◆ industrial sites subject to industrial stormwater permitting requirements
- ◆ bulk terminals marinas
- ◆ facilities that generate or store hazardous materials
- ◆ other land uses and activities as designated by individual review

The following land uses and activities are not normally considered hotspots:

- ◆ residential streets and rural highways
- ◆ residential development
- ◆ institutional development
- ◆ commercial and office developments
- ◆ non-industrial rooftops
- ◆ pervious areas, except golf courses and nurseries

Finally, Part II.G.2.d.iv of the permit allows structural BMPs within drinking water source protection areas only to the extent that they do not allow recharge waters to impact ground water quality such that drinking water maximum contaminant levels (MCLs) are exceeded.

Ground Water Recharge Mitigation

Part III.G.2.e of the permit requires mitigation if the post-development recharge volume is less than the predevelopment recharge volume. The permit provides two options with permit language as follows:

e. Ground water Recharge Mitigation. If the post-development recharge volume is less than the pre-development recharge volume then mitigation will be required. Two options are available for most applications. The preferred method is to convert additional land to land use with higher recharge potential. The difference in ground water recharge between the existing and converted land use recharge is the amount which can be used as recharge credit. Off-site ground water recharge mitigation shall occur within the same Watershed Assessment Unit (14-digit HUC scale) as the permitted site and preferably up-gradient and within a 2 mile radius. Structural (practices that provide engineered seepage into the ground) and non-structural (buffers, rooftop disconnection) practices can also be used to achieve ground water mitigation requirements. Any structures or practices that require impermeable liners, are designed to trap sediment (such as forebays), or intercept ground water may not be considered as ground water recharge mitigation practices. If separate infiltration practices are incorporated upstream of the water quality volume treatment practice, the volume of ground water being infiltrated may be subtracted from the water quality volume for sizing purposes.

Sediment Settling Basins

Part III.G.2.h.ii of the permit requires the use of settling basins for areas that receive drainage from disturbed areas of 5 acres or greater. It includes specific sizing and performance standards for the sediment reduction recommendations in the Big Darby TMDL to be addressed.

ii. Sediment settling ponds. Concentrated stormwater runoff and runoff from drainage areas, which exceed the design capacity of silt fence or inlet protection, shall pass through a sediment settling pond. For common drainage locations that serve an area with 5 or more acres disturbed at one time, a temporary (or permanent) sediment settling pond shall be provided until final stabilization of the site. For drainage locations serving less than 5 acres, smaller sediment basins and/or sediment traps should be used.

The permit specifies the minimum sediment storage volume per acre of drainage and the “target discharge performance standard of 45 milligrams per liter (mg/L) of total suspended solids (TSS)” for storms that deposit three-quarters of an inch of rainfall within 24 hours. In addition, the permit

details some basic design standards and includes requirements for removing sediment from the pond. It also requires that public safety be considered as a design factor.

The permit includes specific sampling requirements and reporting requirements for the settling ponds as follows:

The permittee shall sample in accordance with sampling procedures outlined in 40 CFR 136. Sampling shall occur as follows:

- a. Occur at the outfall of each sediment settling pond associated with the site. Each associated outfall shall be identified by a three digit number (001, 002, etc.);
- b. The applicable rainfall event for sampling to occur shall be a rainfall event of 0.25-inch to a 0.75-inch rainfall event to occur within a 24 hour period. Grab sampling shall be initiated at a site within 14 days, or the first applicable rainfall event thereafter, once upslope disturbance of each sampling location is initiated and shall continue on a quarterly basis. Quarterly periods shall be represented as January–March, April–June, July–September and October–December. Sampling results shall be retained on site and available for inspection. If any sample is greater than the performance standard of 45 mg/l TSS, the permittee shall modify the SWP3 and install/implement new control practice(s) within 10 days to ensure the TSS performance standard is maintained. Within 3 days of improvement(s), or the first applicable rainfall event thereafter, the permittee shall resample to ensure SWP3 modifications maintain the TSS performance standard target.

For each sample taken, the permittee shall record the following information:

1. the outfall and date of sampling;
2. the person(s) who performed the sampling;
3. the date the analyses were performed on those samples;
4. the person(s) who performed the analyses;
5. the analytical techniques or methods used; and
6. the results of all analyses.

Both quarterly and sampling results following a discharge target exceedance shall be retained on site and available for inspection.

Silt Fence Specifications

Part III.G.2.h.iii prohibits the use of a silt fence as primary sediment control for sites larger than 5 acres, unless Ohio EPA preapproves the action in a SWP3.

Post-Construction Design Requirements

Part III.G.2.i requires post-construction stormwater management BMPs that mirror Ohio EPA's statewide construction stormwater general permit, except the Big Darby CGP excludes the use of dry basins.

Structural (designed) post-construction stormwater treatment practices shall be incorporated into the permanent drainage system for the site. The BMP(s) chosen must be sized to treat the water quality volume (WQv) and ensure compliance with Ohio's Water Quality Standards in OAC Chapter 3745-1. The WQv shall be equivalent to the volume of runoff from a 0.75-inch rainfall...An additional volume equal to 20 percent of the WQv shall be incorporated into the BMP for sediment storage and/or reduced infiltration capacity. Ohio EPA recommends that BMPs be designed according to the methodology included in the most current edition of the Rainwater and Land Development manual or in another design manual acceptable for use by Ohio EPA.

Permit Effectiveness

Since the Big Darby CGP was issued in September 2006, there has not been enough time to assess the environmental effectiveness of the permit. The language in the TMDL specifies that the general permit issued should be protective of the aquatic life uses of the Big Darby Creek. Ohio EPA believes that this proactive approach to address current and future threats will protect the unique water quality and biological integrity of the Big Darby Creek watershed.

Lessons Learned

The permitting authority contact, Mr. Jason Fyfe, responded to the following questions to characterize the *lessons learned* from the Big Darby watershed-based permitting project thus far:

- What has been the most challenging part of developing the permit?

The most challenging aspect of developing the permit focused on it being the first of its kind within Ohio, and the permit contained additional requirements not found within the statewide permit. Drafting permit language required the involvement of many staff from different disciplines.

- What could have been done differently to resolve the challenges more easily?

The additional requirements found within the permit required the knowledge and expertise of staff not located within the stormwater program. Earlier involvement of all needed staff would have been beneficial.

- Would this approach be applicable to other watersheds? What characteristics would define other candidate watersheds?

Ohio EPA intends on evaluating other watersheds throughout the state and developing applicable watershed-specific general permits where appropriate and as resources permit. These evaluations will be dependent on findings and recommendations found within future TMDLs.

- If the approach were to be applied in another area, what changes should be made?

[The state should] make sure all needed staff are involved early in the process depending on what additional conditions are warranted in a permit.

Resources

Ohio Environmental Protection Agency. 2005a. *(Draft) Fact Sheet for National Pollutant Discharge Elimination System General Permit for Discharges of Storm Water Associated with Construction Activity Located within the Big Darby Creek Watershed.*

Ohio Environmental Protection Agency. 2005b. *Fact Sheet—Big Darby Creek Draft TMDL Report.*
www.epa.state.oh.us/dsw/tmdl/DarbyTMDL_May05draft_factsheet.pdf

Ohio Environmental Protection Agency. 2006a. *Final 2006 Water Quality Management Plan. Appendix 9-3 208 Plan Prescriptions for Water Quality Protection within the Big Darby Creek Watershed.*
www.epa.state.oh.us/dsw/mgmtplans/208Final2006PlanContents.html

Ohio Environmental Protection Agency. 2006b. News release, May 23, 2006. *Big Darby Creek Water Quality Report Approved.*

Ohio Environmental Protection Agency. 2006c. *General Permit Authorization for Storm Water Discharges Associated with Construction Activity Located Within the Big Darby Creek Watershed Under the National Pollutant Discharge Elimination System. General Permit OHC100001. Issued on September 12, 2006.*
www.epa.state.oh.us/dsw/permits/DarbyStormWater_Final_GP_sep06.pdf

Ohio Environmental Protection Agency, Division of Surface Water. 2004. *Biological and Water Quality Study of the Big Darby Creek Watershed, 2001/2002. Logan, Champaign, Union, Madison, Franklin and Pickaway Counties, Ohio.* EAS/2004-6-3.
www.epa.state.oh.us/dsw/documents/BigDarbyTSD2004

Ohio Environmental Protection Agency, Division of Surface Water. 2005. *Darby at the Crossroads. A Summary of Ohio EPA's Work and Collaboration to Protect and Restore an Important Water Resource.*
www.epa.state.oh.us/dsw/documents/Darby%20Crossroads_june04.pdf

Ohio Environmental Protection Agency, Division of Surface Water. 2006. *Total Maximum Daily Loads for the Big Darby Creek Watershed Final Report.*
www.epa.state.oh.us/dsw/tmdl/BigDarbyCreekTMDL.html

Note: All Web references current as of July 6, 2007.